AN ADDRESS

DELIVERED BEFORE THE

Natural History Club of Philadelphia,

BY

J. GIBBONS HUNT, M.D.

AT ITS

FIRST ANNUAL MEETING.

Published by Request of the Club.

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THOMAS WILLIAM STUCKEY, PRINTER,
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DELIVERED BEFORE

The Natural History Club of Philadelphia.

December 3d, 1868.

In accordance with the rules which govern our Club, it becomes my duty on this, our first Annual Meeting, to present a slight resumé of the work that has interested us during the past year. What a tonic to *healthy organizations* there is in that good, old, homely Saxon word *work!* The nerves throb with a fresher life, and the muscles harden at its sound. Blessed is he or she who *can* work!

We make no claim to have widened the boundaries of science in any direction; but it has been our pleasant and, I trust, *not profitless* occupation to have walked together along many flowery paths which had been trodden by other feet than ours. "Who never walks, save where he sees men's tracks," it is said, "makes no discoveries."

Is it the best thing a man or a woman can do, to make a discovery? to add some new species, or even facts, to the treasury of science? Is it fruitless work to cultivate a *love* for whatever *is* lovely, and pure, and beautiful in Nature? to grow familiar with the *common* things adorning life's road on every side? It is not a wearisome grammar that teaches the voice, and mood, and tense of all the tongues that sing to us in the glad Summer time, or more sternly warn us in the Winter. We have been searching only for the key to unlock a few of the storehouses in Nature's magnificent temple: and if we have found it of iron, and a little rusty in the beginning, better use will polish it, and possibly transmute it to gold.

Our several meetings have been occupied chiefly, though not exclusively, with botanical studies, and to that subject I shall, in a great measure, confine my remarks this evening. A large portion of our work has been the analysis of plants, in order to find their names and position in classification, and we cannot deny that, sometimes, we have found this to be pretty earnest work. But this is a preliminary training which every botanist must have. Before he can repose on the high and moss-grown banks from which a general view is gained of the vegetable kingdom, he must walk in toil along the hard and dusty road of analysis. Step by step only, like children learning to walk, can we advance, understandingly, in our botanical studies. We have found difficulties in the path,—rocks have impeded us; briars and thorns have sprung up just where we thought roses should have bloomed: but never have we despaired of the final truth. It is not possible to practise much the scientific analysis of plants without, at the same time, disciplining the mind in all those intellectual faculties which best develop its strength, and fit it for life's most responsible duties. It compels the student to weigh cautiously every fact, and to compare each fact with others related. The habit of careful, discriminative observation is continually exercised,—sight, touch, and often the taste, each brings to the bar of judgment its treasury of facts; and thus cautiously proceeding, without taking anything for granted, a chain of evidence is linked together, binding the *un*known to the known, and of strength sufficient to bear the richly-jeweled crown of Truth. Equally,—yes, I will say *better* than the mathematics or languages, does the proper study of Natural Science develop the intellectual faculties and strengthen the judgment, and equally with them does it exercise habits of profoundest reasoning and of trained observation. "There is a great difference," says Professor Huxley, "between literary men and those who have had a thorough scientific training. In the world of letters, learning and knowledge are one, and *books* are the source of both; whereas, in science as in life, learning and knowledge are distinct, and the study of *things*, and not of books, is the source of the latter."

But the labor we have given to the analysis of plants has become a pastime, and now we venture to play a little along the road we once pursued, doubtfully and with sweating brows. Seldom now have we difficulty in referring a plant to its proper natural order, and thus have we learned the first great practical lesson in our science.

On March 15th, Flora sent her first gift of flowers to the Club. The little DRABA VERNA and the SYMPLOCARPUS FŒTIDUS came out in time to hear the first croakings of the frogs, though both plants are often found earlier than that date. Then, swiftly following in the warm woodlands and the sunny meadows, we heard the coming footsteps of EPIGEA and STELLARIA and CLAYTONIA. The HEPATICA, too, soon opened its white and blue eyes, and SANGUINARIA felt its red blood stir in the early spring-time. There is a joy inspired by the Spring's first blossoms, not felt by the later gifts of the season; and they have a *personality* not belonging to the, perhaps, richer gifts of Summer. They are the early notes,—heralding the coming of that Divine Spirit which rides the sunbeam, and which sings to us a language like this:—

> "I am the spirit which dwells in the flower,—
> Mine is the exquisite music that flies,
> When silence and moonlight reign over each bower,
> That blooms in the glory of tropical skies.
> I woo the bird, with his melody glowing,
> To leap in the sunshine and warble its strain,
> And mine is the odor, in turn, that bestowing,
> The songster is paid for his music again."

It would be wearisome and profitless, at this time, to note all the plants which came before us at our Summer meetings. Our weekly excursions in the country furnished rich harvests for analysis, and it has been not rare for more than one hundred species to be reported on those occasions. Probably most of our commoner plants have been on our table, as well as not a few of those the books call rare. It is affectation in a botanist to love and search for only the *rarities* of his science. True, as plants are ordinarily studied from books and in schools, the student wearies and is driven over hill and dell to search for something really fresh and interesting. The common flowers we played with in our childhood, and wreathed in chaplet or love-token, ever shall remain the pets of our manhood, and over our grave we would prefer to have the Violet and the Columbine mingled with Innocence rather than the scented Rose of Persia.

> "Can any please,
> And light the infant's eye like these?
> No! no! There's not a bud on earth,
> Of richest tint, or warmest birth,
> Can ever fling such zeal and zest
> Into the tiny hand and breast."

In the Middle Ages, the prize awarded to the best poet was a golden Violet:—

> "And in the golden vase was set
> The prize,—a golden Violet."

"The Romans used to make wine of violets, and the Turks still infuse it in their sherbet. The Highland ladies of former times used the violet as a cosmetic,—the old Gælic receipt being: 'Anoint thy face with goats' milk in which violets have been infused, and there is not a young prince upon earth who will not be charmed with thy beauty.'"

In our plant-studies, we have neglected no opportunity to learn, as much as possible, of the tissues which built up the great fabric of the vegetable kingdom. Cells, in their numerous modifications of size and form and grouping, with their often delicate and beautiful markings, bearing rich deposits of starch or gum, or fragrant oil, or sparkling with raphides, have been somewhat studied. The spiral vessels and ducts, which creep through the other tissues like arteries through our bodies, are quite familiar to the class. The anatomy of the leaf, in its beauty and complexity,—of the stem, in both its types in flowering plants,—of the stamens and pollen,—have claimed a share of our notice. I state only a common truth, when I say that no other botanical class in the city has better facilities for the study of vegetable anatomy, or has given more attention to that important department of botanical science.

It is a delusion to suppose that a scientific knowledge of plants can be taught from books or charts. These will help in showing what ideas others have had on any subject; but, in Botany—which is a demonstrative science—the student wants ideas of his own. He must see with his own eyes, touch with his own hands, and work with his own brains. The teacher should instruct each student how to isolate each one of the plant's tissues from the other, in order that a separate study may be given to each, and then, by sections cut from the mass, all these separate elements should be studied, as they are united to form the several organs. The student should be taught, as an illustration, to take a leaf and separate it into its primary tissues,—in one vessel to put the epidermis, in another the parenchyma, in another the wood-cells, and so on with the spirals and ducts and raphides and glands and latex tissue, if present, and all should be perfectly clean, and then he should be instructed how to preserve all these in a way best suited for scientific study. And until he masters, in this way, the elements of his science, he never can rise to the sublime conception of the Divine idea as figured in a plant. *Then* does botany become a science proudly holding her head on a level with mathematics or the languages, as a means of intellectual culture. But is botany *so taught* in our schools or our colleges? Let teachers furnish the answer.

During the hot summer months, the Club held no regular meetings: the members absent in the country sent in reports. From Pennsylvania's beautiful mountains, in Potter county, came STREPTOPUS ROSEUS, CLINTONIA BOREALIS, and VIOLA BLANDA,—positively that, and not PRIMULIFOLIA nor LANCEOLATA, into which forms the BLANDA sports in this vicinity, —V. ROSTRATA, and CANADENSIS. We were told, too, that the TRIENTALIS AMERICANA and the beautiful WALDSTENIA FRAGAROIDES mingled their starry flowers in the Hemlock's shade, like Purity and Truth, under sorrow,—sometimes, though rarely,—mingle in the commerce of men. We saw the rugged mountain-rocks, those sentinel-watchers of the toils of men, girt by the clasping arms of EPIGEA in full bloom, and the TIARELLA and DENTARIA hung their delicate flowers from heights not easily reached by human foot. Oh! how much there is in our science to call us upward, and to entice us to turn our eyes, at least, toward the stars! Over all these early gifts of Summer, pouring their fragrance over mountain-rocks, like childhood perfumes and gladdens age, hung the Columbine. Folly's flower! its clusters of spurred petals resembling a fool's cap, rather than a nest of doves.

"Then gather roses for the bride,
  Twine *them* in her bright hair,
But, e'er the wreath be done,—oh! let
  The Columbine be there.
For rest ye sure, that follies dwell
In many a heart that loveth well."

From the roar and damp spray of Niagara, we are told of the EUPHORBIA HELIOSCOPIA, (is it so called, because it stares at the sun without winking?) and of the CALAMINTHA GLABELLA, or the "beautiful mint" (looking like just what it is not), and the ISANTHES: of course, we have all seen CALAMINTHAS enough. From the old fort of Ticonderoga, after war's barbaric strife has passed away, springing from a soil consecrated by the blood of American soldiers, were gathered twining Harebells. Grace and beauty meet in this plant, as in no other. Child of the light! Ellen's airy foot, near Loch Katrine, could not tread thee to earth:—

"E'en the slight Harebell raised its head,
Elastic from *her* airy tread."

At Trenton Falls, too, it hung from the lips of the wet rocks in company with CYSTOPTERIS BULBIFERA.

Nearly all our reports speak of the EPILOBIUM, and of the GERANIUM MACULATUM, so widely are they distributed. From the Delaware Water-Gap ten Ferns are reported, but most were familiar to the Club. The sweet voice of a member comes to us from the old mossy well where Molly Pitcher rendered herself famous by drawing water for our wounded and thirsty soldiers on June 28th, 1778. It is natural to link our love of flowers with the shrines of our country, which memory still cherishes.

The old "Tennent Church,"—the oldest in New Jersey now used for worship,—daily sweeps its shadow over soldiers' graves who fell in our great struggle for liberty. Strangers visiting it are shown its box pews and quaint galleries, its high pulpit and sounding-board, and the visitor sits thoughtfully on the rough seats, stained with blood, where soldiers slept in days of battle. The same member measured a hill of corn morning and evening for two weeks, and found the growth was two and a-half inches in the daytime, and five inches during the night. And corn growing near some purple beans had its cobs purple when gathered. Here are two important *facts*.

From Bordentown, New Jersey, we are told of CALOPOGON and DROSERAS, and CEPHALANTHUS and NYMPHÆS; and from farther down the State,—a dismal place for memory to run back into,—it is said the LYGODIUM and HABENARIAS, and POGONIAS and Floating Hearts grow. Well, from the mountain and from the sea, came familiar voices: from Wyoming Valley we heard the Harebells ring; and in Buck Valley, we are told the Flora resembles that of the Schuylkill. HABENARIA FIMBRIATA, with its liquid ciliated lips, told us it grew near Watts' Gap, in the Bunker Hill range, in close company with RHUS VENETATA. Poison and splendor, how often are they allied in this life! From Maryland, from Loudon's hills, and hills of Carroll, we look on the same carpet that covers *our* landscape. From hills and from meadows,

"Where brooks run along,
With their sweet sing-song."

have our working members sent us the glad tidings, that the Spirit of life which first whispered to us in the Spring from the little DRABA VERNA, has "mantled all the land and leaves and grass, and mossy-tinted stones, with Summer glory." "Therefore, let us greet each wandering flower-scent as a boon from *Him*, each bird-note quivering 'midst light Summer leaves, and every rich celestial tint unnamed, wherewith transpierced, the clouds of morn and eve, kindle and melt away."

I would be doing injustice to the Club, did I not allude to our work in cryptogamic botany. This department, so puzzling to students often, we have not found to be surrounded with insurmountable difficulties. Some members of the class could identify a spore of EQUISETUM, if picked up at random in the forest; and we are all familiar with the Silica in the epidermis of this order.

Of the sixty Ferns mentioned in our books, we have learned the physiognomies of thirty-five. Their jewel-like spore-cases, at maturity, bursting and sowing the golden germs of other generations, and often carved with gorgeous tracery, you know, have always interested us. But we have found occasion to study more closely than this the marvelous biography of the Ferns.

If we germinate a seed,—I mean the embryo in the seed, —we get a plant resembling that which produces the seed.

But in the germination of a spore we have observed a different result. It passes through several preliminary stages before it reaches its final development. It climbs, step by step, the devious ladder of life. Indeed, "nothing in the living world is made at once fit for the highest purposes of which it may be capable. In all the countless crowds of living beings,—in all the countless particles of each,—there is not one but in the history of its life we may read a *gradual* attainment of its highest destiny; not one but has a time in which its true purpose is yet future; its true design yet unfulfilled: and although even in its rudiment it is not useless, yet there will be a time when, with higher powers, it will take part in the designs of a more perfect state." We have seen the spore of the Fern germinating,—first, a little vesicle appears on one side; this assumes the form of a little filament,—a few little cells *in a row*, resembling the Conferva, one of the lowest families in the Cryptogamic series. Next, this row of cells has others added to it on either side, until a minute membrane or frond is formed; and each cell is now filled with chlorophyl; and this is the prothallus, or second step, and resembles in appearance the Liverwort, an order higher than the Conferva.

On one part of this prothallus are developed cells of a peculiar kind, and set apart for a special function. The life of the spore is now about to evolve those singular organs, which are analogous in function to the stamens and pistils of the flowering plants. Nature's processes are wonderfully uniform, whether she fashions the feathery Fern in the meadow or rears toward heaven the marvelous column of the SEQUOYA GIGANTEA. On this prothallus round cells appear, elevated somewhat above the general surface; these are soon filled with secondary cells, which presently give evidence of a singular motion in the interior of each. Gradually all enlarge, and soon these secondary cells rupture and give exit to the antherozoids, which are minute cells of a definite shape, and driven about in the water by cilia attached to one end.

The organ we have described is the antheridium, and it has matured millions of motile cells, each one of which represents the life of the future Fern. So minute are these bodies, that countless millions of them might spin out their brief lives in a tear-drop. On what a slender thread, now, does the life of the Ferns depend. Cells a thousand times too small to be seen by unassisted eyes, swim around in oceans formed of dew-drops, each freighted with its infinitesimal cargo of life. Let danger or shipwreck come, now, to these antherozoids, and the south winds of the coming seasons would search the woods and the meadows for LYGODIUM and ONOCLEA and OSMUNDA in vain. On other parts of the prothallus, cells of another kind are formed, arranged one on the other around a central canal, like bricks in a chimney, and these little organs,—called pistillidia,—are elevated quite above the surface of the prothallus. Down at the bottom of these pistillidia lie the embryos of the future Ferns, and there would they lie forever, did not the antherozoids descend these little chimneys, and come in contact with the embryos, and thus start into life a new growth, which soon develops into young Ferns. Do we not love these graceful plants more, after having studied out their biography in this manner? We cannot avoid the conviction, that the poetry of facts and of science is richer than fiction; and *blind* would we be, if we failed to see, in our study of the Ferns, that the same mysterious Power which keeps the smallest planets ever nearest the sun, nurses, also, these plant-atoms, sporting, as it were, in the very cradle of life.

Our work among the Mosses has revealed a history closely parallel with that of the Ferns. Their capsules carved, often with beautiful stomata, and fringed with the peristome,—single in ATRICHUM, double in MNIUM: the OPERCULA, ANNULUS, COLUMELLA, and swarming golden spores are familiar to every member.

Among the Liverworts, too, we have made some acquaintances. MARCHANTIA has shown us *its* flask-shaped antheridia and swarming antherozoids: its pistillidia resembling those of the Ferns; its beautiful stomata built up over fairy grottoes lying in the fronds. Its oval spores and twining elators, as well as those of GRIMALDIA and PELLIA, and ANEURA and others, have passed over the fields of our microscopes. We have noticed the exquisite spiral cells lining their capsules, and noted their analogy with similar structures in the anthers of some flowers. At the right season, Nature turns the key, and these spiral elastic cells, in the capsule and in the anther alike, spring open, and scatter the spores or pollen abroad.

In the boundless harvest-fields of the Lichens and Algæ and Fungi, we have gleaned only enough to awaken a desire for further knowledge, as opportunity shall offer. Deeply interesting has been our work among the Cryptogams, and many have been the beautiful chapters revealed to us in this department of Nature's magnificent volume. Pages written in small type, you may think; but each letter is stamped in charming shape, and shines with a lustre, only less than that of the stars.

"In every clime, on every shore,
They cling, or creep, or twine;
Where bleak Norwegian winters roar,—
Where tropic summers shine."

I have been speaking of the past. Let us now send our thoughts onward, a little into the future. You will all believe me, when I say there is still some work waiting to be done. The *naming* of a species is not of principal importance in the scientific study of botany. We have found it desirable to learn a few hard terms, and quite easy to *forget* a great many. But to know a plant, is to have familiarized ourselves with a thought of the Creator! to know its name, is to have learned only a fragment of the ever-changing systems of men.

Shall we ask of the coming year a few reasonable questions? . The Squirrel Corn (DICENTRA CANADENSIS) is a plant easily obtained in this locality. Why are its six stamens united in *two* sets of three each? and why has the middle anther of each set two cells: the lateral one *only* one cell? Does each kind of anther, in this plant, produce pollen alike in form, and alike in function? and which pollen is it that fertilizes the plant? Or in LESPEDIZA, where the anthers appear to be alike, why is one stamen left standing alone, and nine others united? Is it pollen from the nine, or from the solitary one, that is commissioned to transmit the life of the plant, after its own kind, forever? Where such a difference in form is so apparent, may it not be *possible* a difference in function exists too? and the detection of that difference, if it exists, or the proof of its absence, would be as interesting, perhaps, as the identification of all the species of this rather puzzling genus. You remember that bouquette of Fringed Gentian which came before us at a recent meeting, with its petals blue and dark and cold, like patches of the wind-clouds of October! It cannot be cultivated in gardens; it never makes its home under the rich man's window, nor does it listen to the hum of the wheel in the poor man's cottage. Is it a parasite? Will it bear no nursing, save in the lap of its wild mother, Nature? hear no song, but the wild laugh of the rill? Questions like these are waiting solution:

> "And so the 'thought' intently gleaning,
> O'er fields of 'yet unwritten' lore,
> May light upon a holier meaning,—
> A meaning never found before."

In this way then, my friends and comrades, have I endeavored to recall some of our pleasant recollections of the past year. Only a few crumbs from our weekly table have I brought here this evening, more for refreshment than solid nutrition. I have not said all. Perhaps the best part of every mind is just that which is left unsaid; as, when the water is poured from the glass, some always lingers at the bottom. The time we have spent in our semi-scientific, social meetings has not been profitlessly spent. Our efforts to keep a little life in the tree of knowledge have elevated somewhat the tone of the society in which we have daily mingled; and as we have learned to live in more intimate fellowship with the natural world,—which is but the foreshadowing of the supernatural,—I indulge the hope that we may have gathered a *little* strength against the day of trial. We have seen the flowers of Summer fade, and stern Autumn come, and with his pale and frosty fingers streak the leaves with gold and purple before he blew them into dust; and my concluding wish for each one of you, my friends, is, that when *your* leaves of life shall drop, you may come out in glory, like the Witch-Hazel, after all these summer beauties shall have passed away.